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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/989,273

Filing Date: November 20, 2001

Appellant(s): HANSON ET AL.

William Robert Hanson

For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed February 23, 2006 appealing from the Office action mailed August 24, 2005.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

9.1 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9.2 Claims 1, 2, 4 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (U.S. Patent No. 5,982,092) in view Baur et al. (U.S. Patent No. 4,142,781).

Regarding claim 1, Chen ('092) discloses a lighting system for a display (Figure 3) comprising:

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- a light source system including a light source 40 providing light not visible to the human eyes (Figure 3, column 1, lines 10-14, and column 3, lines 43-45);
- a reflective layer- combination of the fluorescent pigment layer 50 optically in contact with the reflecting layer 30- herein after referred as the reflecting layer 50,30 (Figure 3, column 3, lines 5-7 and 11-20);
- the reflective layer 50,30 reflecting invisible light from the light source 40, and converting invisible light into light visible to human eyes (Figure 3, column 3, lines 5-7 and 11-20);
- a display layer having pixels alterable with application of electrical charge – interpreted as a liquid crystal display –LCD- (not shown, column 1, lines 17-20) well known in the art, and as evidenced by Baur et al. ('781);
- the display layer being illuminated by visible light from the reflective layer 50,30 (not shown, column 1, lines 17-20);
- the light source 40 located below the display layer – the lighting system operating as a back light source not shown, column 1, lines 17-20);

However, regarding Claim 1, Chen ('092) does not disclose a light source including a reflective layer having a phosphorescent.

On the other hand, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising a fluorescent plate 1a including a phosphorescent

coating - a layer 25 containing phosphorescent particles has been broadly interpreted as coating- (Figure 9, column 9, lines 5-10).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the lighting system of Chen ('092) by providing the phosphorescent coating as taught by Baur et al. ('781) for the benefits and advantages of amplifying the brightness of the display device, and for providing afterglow of the display after the device is switched-off.

Regarding claims 2, 4 and 7-9, Chen ('092) in view Baur et al. ('781) discloses the lighting system (Figure 3) further including;

- a light guide 10 (Chen, Figure 3, column 2, line 54);
- the light source 40 being a single light source, and being a light emitting diode (LED) 40 (Chen, Figure 3, column 3, lines 11-13);
- the reflective layer 50,30 including fluorescent coating 50 (Chen, Figure 3, column 3, lines 5-7 and 11-20) on a substrate;
- the light source providing an ultraviolet (UV) light (Chen, Figure 3, column 1, lines 9-12, and column 3, lines 34-38);-

Regarding Claim 6, Chen ('092) discloses a lighting system including a reflective layer on a substrate. However, Chen ('092) does not specifically teach the reflective layer including metallic coating. It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the lighting system of Chen ('092) by providing a reflective surface (aluminum mirror surface) with metallic coating as evidenced by Baur et al. ('781) in Claim 8.

9.3 Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (U.S. Patent No. 5,982,092) in view Baur et al. (U.S. Patent No. 4,142,781) as applied to claim 1 above, and further in view of Vossler (U.S. Patent No. 5,856,819).

Chen ('092) in view of Baur et al. ('781) teaches a light source 40 providing light having wavelength in a spectrum not visible to the human eyes (Figure 3, column 1, lines 10-14, and column 3, lines 10-14). However, neither combined nor individual teaching of Chen ('092) and Baur ('781) specifically teaches the light source providing infrared (IR) light.

On the other hand, Vossler ('819) discloses a bi-directional presentation display 10 (Figures 1 and 2) illuminated with an IR light source – alternate to the light tube 70- (Figure 2, column 5, lines 44 and 49-57).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to further modify the lighting system of Chen ('092) in view of Baur ('781) by providing the IR-based lighting system as taught by Vossler ("819) for the benefits of making it usable in dark or at night with night vision equipment.

9.4 Claims 10 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (U.S. Patent No. 5,982,092) in view Vossler (U.S. Patent No. 5,856,819) and Yamashita (US Patent No.: 4,599,537).

Regarding Claim 10, Chen ('092) discloses a lighting system for a display (Figure 3) comprising:

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- a light source system including a light source 40 providing light not visible to the human eyes (Figure 3, column 1, lines 10-14, and column 3, lines 43-45);
- a reflective layer- combination of the fluorescent pigment layer 50 optically in contact with the reflecting layer 30- herein after referred as the reflecting layer 50,30 (Figure 3, column 3, lines 5-7 and 11-20);
- the reflective layer 50,30 reflecting invisible light from the light source 40, and converting the invisible light into light visible to human eyes (Figure 3, column 3, lines 5-7 and 11-20);
- a display layer having pixels alterable with application of electrical charge – interpreted as a liquid crystal display (LCD) (not shown, column 1, lines 17-20) as taught by Baur et al. ('781);
- the display layer being illuminated by visible light from the reflective layer 50,30 (not shown, column 1, lines 17-20);

However, Chen ('092) does not specifically teach a display layer being illuminated by infrared light. Instead, Chen ('092) makes the use of ultraviolet light source for illumination of the display layer.

On the other hand, Vossler ('819) discloses a bi-directional presentation display 10 (Figures 1 and 2) illuminated with an IR light source – alternate to the light tube 70- (Figure 2, column 5, lines 44 and 49-57).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to further modify the lighting system of Chen ('092) by providing

the IR-based lighting system as taught by Vossler ('819) for the benefits of making it usable in dark or at night.

Further, It would be have been obvious to one of ordinary skill in the art at the time of the invention to meet the method limitations of Claim 10 by applying the teaching of Chen ('092) in view Vossler ('819).

Regarding claims 13-15 Chen ('092) in view of Vossler ('819) discloses a lighting system further including:

- the light source being positioned behind the display element (not shown, Chen, column 1, lines 17-20);
- the reflective layer including metallic (aluminum mirror surface) surface well known in the art, and as evidenced in claim 8 of Baur et al. ('781);
- the display element being an LCD (Chen, not shown, column 1, lines 17-19);

Regarding claim 16, neither combined nor individual teaching of Chen ('092) and Vossler ('819) teach lighting system illuminating electronic paper(e-paper) displays.

It has been held that a recitation with respect to the manner in which a claim apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitation.

Further, It would be have been obvious to one of ordinary skill in the art at the time of the invention to meet the method limitations of Claims 13-16 by applying the teaching of Chen ('092) in view Vossler ('819).

9.5 Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (U.S. Patent No. 5,982,092) in view Vossler (U.S. Patent No. 5,856,819) as applied to Claim 10 above, and further in view of Yamashita (US Patent No.: 4,599,537).

Regarding Claim 11, Chen ('092) in view of Vossler ('819) discloses a lighting system including a source of light. However, neither combined nor individual teaching of Chen ('092) and Vossler ('819) specifically discloses the light source being a light emitting diode (LED).

On the other hand, use of LEDs for visible as well as infrared light as taught by Yamashita ('537) for its compactness, long operational life and high-energy efficiency.

It would be have been obvious to one of ordinary skill in the art at the time of the invention to further modify the lighting system of Chen ('092) by providing the LED as light source well known in the art for the benefits its compactness, long operational life and high-energy efficiency.

Further, It would be have been obvious to one of ordinary skill in the art at the time of the invention to meet the method limitations of Claim 11 by applying the teaching of Chen ('092) in view Vossler ('819) and Yamashita ('537).

9.6 Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (U.S. Patent No. 5,982,092) in view Vossler (U.S. Patent No. 5,856,819) as applied to Claim 10 above, and further in view of Lueder (US Patent No.: 6,559,918 B1).

Regarding Claim 12, Chen ('092) in view of Vossler ('819) discloses a lighting system including an LCD with a display element. However, neither combined nor individual teaching of Chen ('092) and Vossler ('819) specifically discloses the display element being flexible.

On the other hand, use of flexible liquid crystal display is well known in the art as evidenced in Lueder ('918 B1) discloses a flexible liquid crystal display (Figure 1, column 2, lines 20-22).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to further modify the lighting system of Chen ('092) in view of Vossler ('819) by providing the Flexible LCD as taught by Lueder ('918 B1) for the benefits of improved mechanical stability and displaying massages in multi-dimensional frame.

Further, It would be have been obvious to one of ordinary skill in the art at the time of the invention to meet the method limitations of Claim 12 by applying the teaching of Chen ('092) in view Vossler ('819) and Yamashita ('537) and Lueder ('918 B1).

9.7 Claims 17-19, 22 and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen (U.S. Patent No. 5,982,092) in view Baur et al. (U.S. Patent No. 4,142,781) and Kim et al. (US Patent No.: 6,204,902 B1).

Regarding claim 17, Chen ('092) discloses a lighting system for a display (Figure 3) comprising:

- a light source 40 providing light not visible to the human eyes (Figure 3, column 1, lines 10-14, and column 3, lines 43-45);
- a light guide 10 dispersing the invisible light over a defined area (Figure 3, column 2, lines 56-62);
- a converter 50,30 – the combination of the reflective layer 30 and the combination of the fluorescent pigment layer 50 optically in contact with the reflecting layer 30- herein after referred as the converter 50,30 (Figure 3, column 3, lines 5-7 and 11-20); and
- the converter 50,30 converting invisible light from the light source 40 into light visible to human eyes (Figure 3, column 3, lines 5-7 and 11-20).

Chen ('092) discloses a lighting system including a reflective layer on a substrate. However, Chen ('092) does not specifically teach the reflective layer including metallic coating. Further, Chen ('092) does not disclose a light source including a reflective layer having a phosphorescent.

On the other hand, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising:

- a reflect plate including metallic mirrored coating (Figure 9, claim 8); and
- a fluorescent plate 1a, and an additional phosphorescent coating - a layer 25 containing phosphorescent particles- (Figure 9, column 9, lines 5-10).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the lighting system of Chen ('092) by providing a

reflective surface (aluminum mirror surface) with metallic coating well known in the art to reflect light for display illumination.

Further, it would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the lighting system of Chen ('092) by providing the phosphorescent coating as taught by Baur et al. ('781) for the benefits and advantages of amplifying the brightness of the display device, and for providing afterglow of the display after the device is switched-off.

In addition, Chen ('092) discloses an LED planar light system usable as a light source for a liquid crystal display (Figure 3, column 1, lines 17-19). However, Chen('092) does not specifically teach the LED planar light system combined with a flexible display receiving and transmitting visible light.

On the other hand, Kim et al (' 902 B1) discloses flexible plate LCD device (Figure 1) receiving and transmitting visible light (Figure 1, column 2, lines 1-6).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to further modify the lighting system of Chen ('092) in view Baur et al. ('781) by providing the flexible display layer as taught by Kim et al (' 902 B1) for the benefits and advantages illuminating displays on non-planar surfaces.

Regarding claims 19,22, 24, 26 and 27, Chen ('092) in view Baur et al. ('781) and Kim et al (' 902 B1) discloses the display system further comprising:

- the flexible display (Kim, Figure 1) positionable over the light guide 10 (Chen, Figure 3, column 2, lines 56-61);

- a converter 50,30 – the combination of the reflective layer 30 and the combination of the fluorescent pigment layer 50 optically in contact with the reflecting layer 30- herein after referred as the converter 50,30 (Chen, Figure 3, column 3, lines 5-7 and 11-20);
- the light source 40 including a light emitting diode (LED) (Chen, Figure 3, column 3, line 39, claim 2);
- the light source providing an ultraviolet (UV) light (Chen, Figure 3, column 1, lines 9-12, and column 3, lines 34-38); and
- the light source 40 combining with the light guide 10 to form a front lighting system (Chen, Figure 3, column 1, lines 17-19).

Regarding claims 18 and 25, Chen ('092) in view Baur et al. ('781) and Kim et al ('902 B1) discloses the display system further comprising:  
However, regarding claims 18 and 25, neither combined nor individual teaching Chen ('092) and ('781) teaches the display system having a back lighting system including a flexible display layer overlaying the light guide. On the other hand, Chen ('092) teaches a front lighting system having a light guide overlaying the flexible display layer.

It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the display system of Chen ('092) by positioning the flexible display layer overlaying the light guide, since it has been held that rearranging parts of an invention involves only routine skill in the art.

**(10) Response to Argument**

10.1 Applicant's arguments filed on Jun 8, 2005 with respect to the 35 U.S.C. 103(a) rejections of claims 1-27 have been fully considered but they are not persuasive.

Argument: Regarding the amended claims 1, 2, 4 and 6-9, Chen ('092) does not teach or suggests "fluorescent pigment layer 50" is as coating.

Response: "coating" is defined as "a layer of substance covering another" (Ref.: Webster New Collegiate Dictionary, 10th Edition, Page 219)

As detailed in section 3 of this office action, Chen ('092) discloses a lighting system for a display (Figure 3) comprising:  
- a reflective layer 50,30- combination of the fluorescent pigment layer 50 optically in contact with the reflecting layer 30- (Figure 3, column 3, lines 5-7 and 11-20);

The fluorescent pigment layer 50 has been broadly interrelated as a coating when the layer is in optical contact with the reflection layer 30 (Chen, Figure 3).

Argument: Regarding Claims 1, 2, 4 and 6-9, the Examiner has provided no basis or support either in Chen or otherwise that the fluorescent pigment layer 50 optically in contact with the reflecting layer 30.

Response: In Figure 3, Chen clearly shows fluorescent pigment layer 50 optically in contact with the reflecting layer 30. Further, the fluorescent pigment layer 50 is structurally supported, and in physical contact with the reflecting layer 30 (Figure 3).

Argument: Regarding the amended Claims 1, 2, 4 and 6-9, Chen ('092) teaches an LED planar light source including a separate fluorescent pigment layer 50 interposed between the light-conductive plate 10 and the light-reflective plate 30 (Chen, col. 2, lines 66 and 67; and col. 3, line 3). As elements 30 and 50 are two separate components, the fluorescent pigment layer 50 is also considered as a separate element.

Response: The phrase "interpose" has been interpreted as the phrase indicating relative positioning of any element. Chen ('092) teaches the relative position – between the light-conductive plate 10 and the reflective layer 30 - of the fluorescent pigment layer, which has been broadly interpreted as coating.

Further, It would be have been obvious to one of ordinary skill in the art at the time of the invention to make the fluorescent pigment layer integral, in optical contact, with the reflective layer, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together is a merely a matter obvious engineering choice, and involves only routine skill in

the art. In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965).

Argument: Regarding the amended Claims 1, 2, 4 and 6-9, Chen ('092) does not teach a reflective layer having phosphorescent coated surface that both reflect the invisible light, and convert the invisible light into visible light.

Response: Chen ('092) teaches a fluorescent pigment layer 50 - broadly interrelated as a coating- is in optical contact with the reflective layer 30.

However, Chen ('092) does not disclose a light source including a reflective layer having a phosphorescent material. On the other hand, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising a fluorescent plate 1a including a phosphorescent coating - a layer 25 containing phosphorescent particles (Figure 9, column 9, lines 5-10). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the reflective layer with fluorescent coating of Chen ('092) by providing the phosphorescent coating as taught by Baur et al. ('781) for the benefits and advantages of amplifying the brightness of the display device, and for providing afterglow of the display after the device is switched-off.

Argument: Regarding the amended Claims 1, 2, 4 and 6-9, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising a fluorescent plate 1a, and an additional phosphorescent coating - a layer 25 containing phosphorescent particles- (Figure 9, column 9, lines 5-10).

The above-indicated teaching does not teach the fluorescent plate, with an additional phosphorescent coating, being a reflective plate.

Response: Regarding Claims 1, 2, 4 and 6-9, Chen ('092) discloses a light source including a reflective plate 30 in combination with a fluorescent pigment layer 50. However, Chen ('092) does not disclose a light source including a reflective layer having phosphorescent pigments.

On the other hand, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising a fluorescent plate 1a, and an additional phosphorescent coating - a layer 25 containing phosphorescent particles- (Figure 9, column 9, lines 5-10).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the reflective layer with fluorescent coating of Chen ('092) by providing the phosphorescent coating as taught by Baur et al. ('781) for the benefits and

advantages of amplifying the brightness of the display device, and for providing afterglow of the display after the device is switched-

As detailed above, Baur et al ('781) teaches that an additional phosphorescent coating applied on a fluorescent plate 1a. Thus, teaching of Baur et al. ('781) could be applied on the reflective layer with fluorescent coating of Chen ('092). Further, the motivation for the above-indicated modification includes amplification of brightness of the display device

The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. Thus, based on the teaching of Baur, one of ordinary skill in the art at the time of the invention would have been motivated to modify the device of Chen for efficient conversion of invisible light to visible light, and for producing afterglow of the device.

Argument: Regarding Claims 1, 2, 4 and 6-9, Chen provides motivation not to use a single layer because of inherent disadvantages of using a single layer.

Response: "a single reflective layer" is not claimed by the applicant.

Further, the above-indicated conclusion "a single layer because of inherent disadvantages of using a single layer has not been found in either Chen ('092) or Baur et al. (781).

Argument: Regarding claims 10 and 13-16, the prior art Yamashita (US Patent No.: 4,599,537) has been advertently added in the 35 U.S.C. 103(a) rejection statement detailed in section 5 of the Final Rejection. As Yamashita (US Patent No.: 4,599,537) has not been relied on for rejections of claims 10 and 13-16, the appellants do not address Yamashita ('537) with regard to rejections of the above-indicated claims.

Response: The examiner appreciates and concurs with appellant's findings and thinking for not addressing Yamashita ('537) in the discussion of the claim rejections indicated above.

Argument: Regarding claims 10 and 13-16, neither in combination or individually Chen ('092) and Vossler ('819) teaches conversion of infrared light into visible light by reflecting infrared light by the reflective layer including a phosphorescent and fluorescent surface.

Response: As detailed in section 5 of the Final Rejection, Regarding Claim 1, Chen ('092) discloses a light source including a reflective plate 30 in combination with a fluorescent pigment layer 50.

However, Chen ('092) does not specifically teach a display layer being illuminated by infrared light. Instead, Chen ('092) makes the use of ultraviolet light source for illumination of the display layer.

On the other hand, Vossler ('819) discloses a bi-directional presentation display 10 (Figures 1 and 2) illuminated with an IR light source – alternate to the light tube 70- (Figure 2, column 5, lines 44 and 49-57).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to further modify the lighting system of Chen ('092) in view of Baur ('781) by providing the IR-based lighting system as taught by Vossler ("819) for the benefits of making it usable in dark or at night with night vision equipment.

Regarding Claims 10,12, 17-19, 22 and 24-27, the above-indicated responses presented for the Claim 1 are equally applicable.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer. For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Sandra O'Shea  
Supervisory Patent Examiner  
Technology Center 2800

MAY 10, 2006

Conferees:

SPE: Mr. Drew A. Dunn 

SPE: Mr. Nimesh Kumar D. Patel 

Examiner: Hargobind S. Sawhney

HSS

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